

YOUR WING EXPERIMENT AND THE NASA EDUCATION RIG

SHIPPING & ARRIVAL AT NASA

The shipping process can be quite severe for packages, perhaps even more severe than operation in the drop tower! When packaging your experiment, you must make sure all nuts, screws, etc are tight and won't shake loose. Any loose parts needs to be tied or taped securely in place.

You need to make sure any liquids in your experiment do not leak out. Double- or triple-bagging containers makes sense. If it is straightforward for the NASA staff to pour the liquid in the experiment, the liquid can be sent in a properly sealed container (but still double- or triple-bagged) along with detailed instructions for assembling the experiment.

When a WING experiment arrives at NASA, it is examined by the NASA staff for adherence to safety standards and any possible damage incurred during shipping.

FITTING IN THE DROP TOWER

The experiment is also checked for its physical dimensions to make sure it will fit into the clear plastic box (Figure 1) in the NASA Education Rig. A WING experiment is placed in that protective box when it is operated in the NASA drop tower to protect the NASA Education Rig from damage that may occur with experiments whose liquid leaks out or parts that get loose.



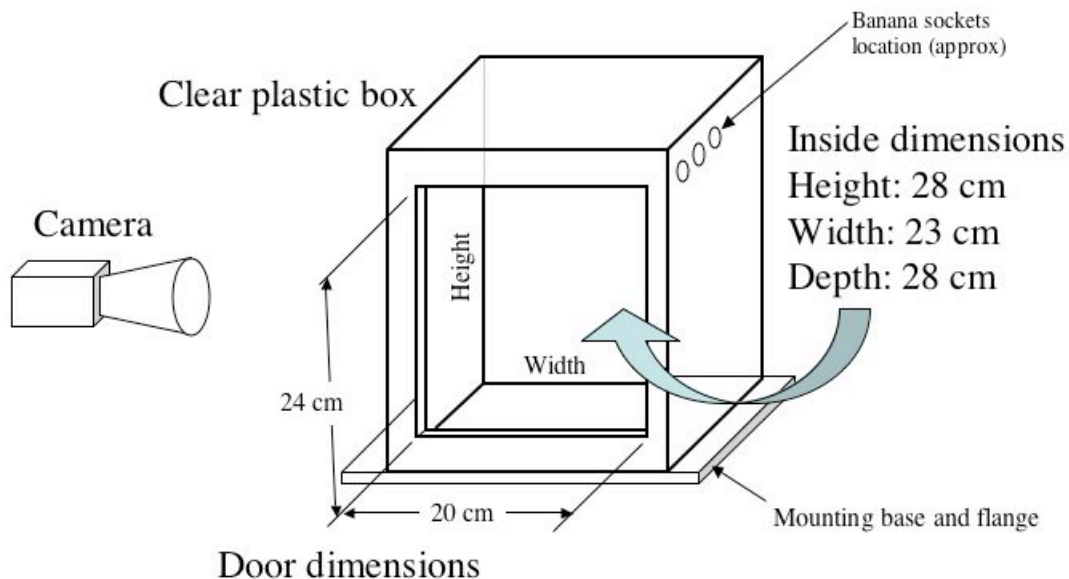
Figure 1: Clear plastic box used to contain WING experiments.

The inside dimensions of the clear plastic box are 28 cm x 23 cm x 28 cm (11 in x 9 in x 11 in), as shown in Figure 2. However, if you design your experiment to fit those dimensions it will NOT be able to be inserted into the clear plastic box. The reason is that the clear plastic box has an opening whose dimensions are

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smaller than the dimension of the box interior. The dimensions of the opening are 24 cm high x 20 cm wide (9.4 in x 7.8 in). Obviously, the team's experiment must be constructed to fit completely through this opening because a cover is placed over this opening to seal the box. Therefore, as long as your experiment will fit these dimensions either entirely, or prior to assembly, it should be okay.

OVERALL VIEW



RevB
RD 03-3-2010

Figure 2: Clear plastic box dimensions

Please occasionally check the experiment apparatus as it is built and modified to make sure it will still fit when it's done. If you think this issue is too simple to be missed, a few experiments in the past had to be 'trimmed' with a bandsaw to fit in the opening!

WORKING WITH THE DROP TOWER

We do realize that some experiments need a "trigger" to turn something on or off when it is released to fall or just before it is released. The drawing in Figure 2 shows three banana jack sockets for electrical connections that may be needed by some experiments. These sockets were not installed at the time the Figure 1 photograph was taken. These sockets are for electrical contacts that act as a switch when the whole Education Rig is released to fall. At that time, one set of

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contacts changes from CLOSED to OPEN and the other set of contacts changes from OPEN to CLOSED. These contacts may be used to activate or deactivate something in your team's experiment. It is suggested that your experiment be able to sense the onset of microgravity as it is released to fall.

The floor of the clear plastic box has hook-and-loop type fastener material (e.g. Velcro™). NASA will stick the opposite material, as required, to the team's experiment to hold the experiment in place. Therefore, the team does not need to include it with the experiment.

The Education Rig (Figure 3) is a larger structure that contains the camera, lights, power supply, and controls for the experiment. The clear plastic box is mounted on the top shelf of the Education Rig and is labeled "Experiment Volume (maximum)" and is shown in Figure 3.

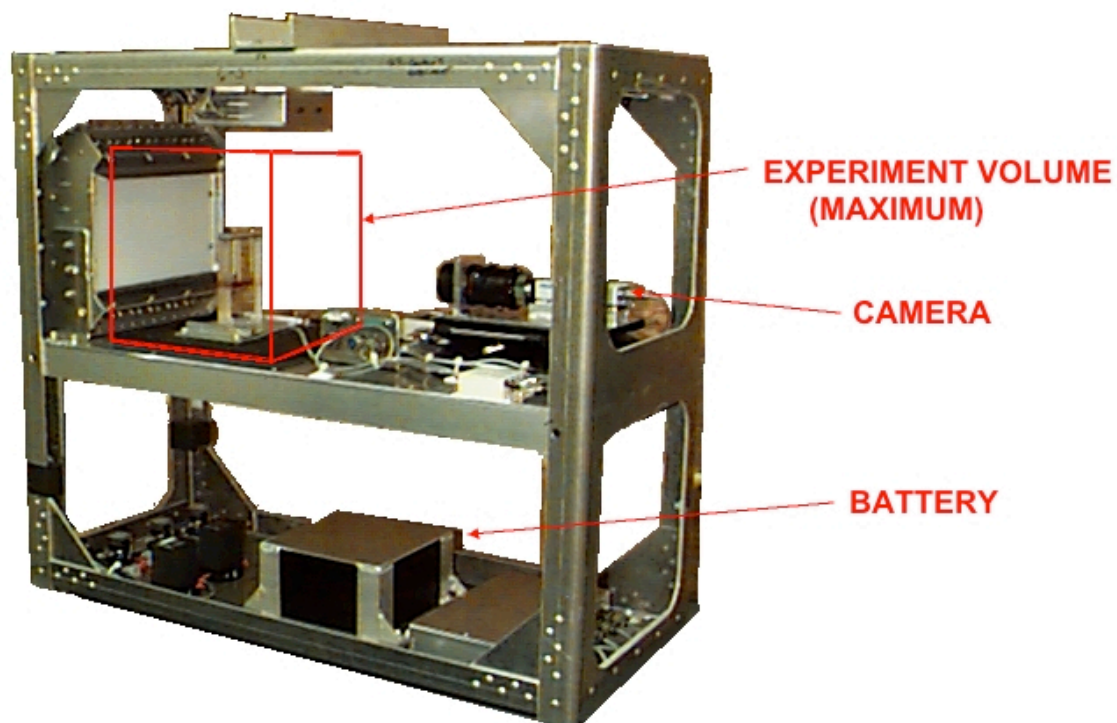


Figure 3: Education Rig for the 2.2 Second Drop Tower

For the camera to view the experiment properly, your team should make sure the "center of action" is centered left and right and about 12 to 15 cm (5 to 6 in) above the plastic box floor. The DIME Experiment Requirements Document has a diagram of the camera view in Figure 10 on page 13. You can find that document from the DIME/WING home page at:

http://spaceflight systems.grc.nasa.gov/DIME_Documents/DIME_2010_EDR.pdf

An experiment mounted inside the clear plastic box and installed in the Education Rig is shown in Figure 4. In that figure, the cover is not yet installed on the plastic box.

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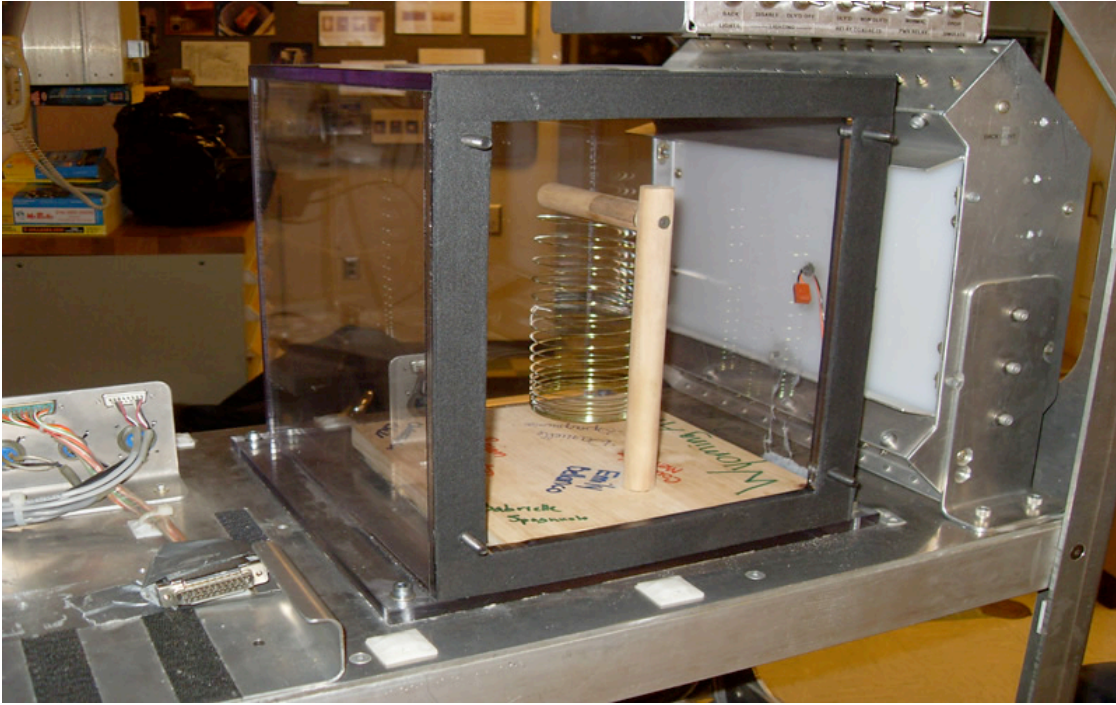


Figure 4: WING experiment mounted inside the clear plastic box installed in the Education Rig prior to operations in the 2.2 Second Drop Tower. The experiment was comprised of a wooden base, a wood dowel post and arm, and a Slinky™.